image quality, a fluctuation of the electrode voltage may be detected when the touch electrode is in contact with the common electrode. Then, touch position coordinates may be calculated taking its fluctuation into account.

In an example described above, the first display electrode is disposed on the first substrate, and the second display electrode is provided on the second substrate. This example typically corresponds to a twisted nematic liquid crystal mode. However, in another example of the present invention, both the first display electrode and the second display electrode may be disposed on the first substrate. This example corresponds to an in-plane switching mode. FIG. **11** schematically shows a perspective view illustrating one pixel in the liquid crystal display element where the common electrode is used as the first touch electrode in an in-plane switching mode. The pixel electrode **41** that is the first display electrode and the common electrode **42** that is the second pixel electrode are formed on the first substrate **14**. In brief, the common electrode **42** is grounded and the thin film transistor **41** is allowed to be in an ON-state or an OFF-state, thus controlling a voltage applied to the pixel electrode **41**, whereby alignment of liquid crystal changes and an image can be displayed. The touch electrode **44** is formed on the second substrate **17** and a constant voltage for detecting a touch position is applied to it. FIG. **11** is a view showing that the touch electrode is formed on the whole of the second touch electrode. However, the touch electrode may be vertically and horizontally formed in a mesh state in the same way as the second touch electrode **24** in FIG. **6**. Alternatively, the touch electrode may be formed in the position where it overlaps the common electrode **42** of the first substrate. In FIG. **11**, by being depressed with a finger from the surface of the second substrate **17**, the common electrode **42** and the touch electrode **44** are in contact with each other. Then, a voltage difference between the grounded common electrode **42** and the touch electrode **44** to which a constant voltage is applied creates a current flow, whereby a touch position is detected.

Although the present invention has been described in detail with reference to the preferred embodiment, showing concrete examples, the present invention in not to be limited to the particular embodiments. And the present invention encompasses any modifications or alternative embodiments that fall within the scope of the claims.

As described above, a liquid crystal display element integrated with a touch sensor incorporates a touch sensor means in it. Accordingly, as compared with the case where the touch sensor unit is attached externally to the liquid crystal display element, thickness and weight of the element itself can be lessened and cost can be decreased. Consequently, a touch sensor function can be given to an electronic apparatus such as a note book type personal computer required to be compact and light weight and to have a relatively large display screen. Additionally, possessing a pillar-shaped spacer and a convex-shaped part improves touch performance and durability.

While the present invention has been particularly shown and described with respect ot preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent is:

1. A liquid crystal display element integrated with a touch sensor comprising:

a first substrate and a second substrate opposing said first substrate;

a liquid crystal layer interposed between said first substrate and said second substrate;

a display electrode for an image display disposed on the surface adjacent to said liquid crystal layer of at least either the first substrate or the second substrate; and

a touch electrode comprising a first touch electrode disposed on said first substrate and a second touch electrode disposed on said second substrate, whereby detection of a touch point relative to said first substrate or said second substrate by contact of said first touch electrode and said second touch electrode is enabled.

2. A liquid crystal display element integrated with a touch sensor according to claim **1**,

wherein said touch electrode is formed on said display electrode via an insulating layer.

3. A liquid crystal display element integrated with a touch sensor according to claim **1**,

wherein said display electrode is formed in a pattern and said touch electrode is formed in the area where said display electrode is not formed.

4. A liquid crystal display element integrated with a touch sensor according to claim **3**,

wherein a liquid crystal display element integrated with a touch sensor further includes a thin film transistor and a pixel electrode drive wiring disposed on said first substrate, and said display electrode is composed of a first display electrode disposed on said first substrate and a second display electrode disposed on said second substrate, and said first display electrode is a pixel electrode and said second display electrode is a common electrode.

5. A liquid crystal display element integrated with a touch sensor according to claim **4**,

wherein said first touch electrode is formed on said pixel electrode drive wiring via an insulating layer.

6. A liquid crystal display element integrated with a touch sensor according to claim **4**,

wherein at least either said pixel electrode and said common electrode is a transparent conductive film.

7. A liquid crystal display element integrated with a touch sensor according to claim **1**,

wherein said touch electrode is disposed on the surface adjacent to said liquid crystal layer on said first substrate, and said display electrode is disposed on the surface adjacent to said liquid crystal layer on said second substrate, and a touch point relative to said first substrate or said second substrate is detected by contact of said touch electrode and said display electrode.

8. A liquid crystal display element integrated with a touch sensor comprising:

a first substrate and a second substrate opposing said first substrate;

a liquid crystal layer interposed between said first substrate and said second substrate;

a display electrode disposed on the surface adjacent to said liquid crystal layer of at least either said first substrate or said second substrate;

a convex-shaped part disposed on the surface adjacent to said liquid crystal layer of at least either said first substrate or said second substrate; and

a touch electrode for detecting a touch position disposed on said convex-shaped part.

9. A liquid crystal display element integrated with a touch sensor according to claim **8**,

wherein said liquid crystal display element integrated with a touch sensor further includes a pillar-shaped